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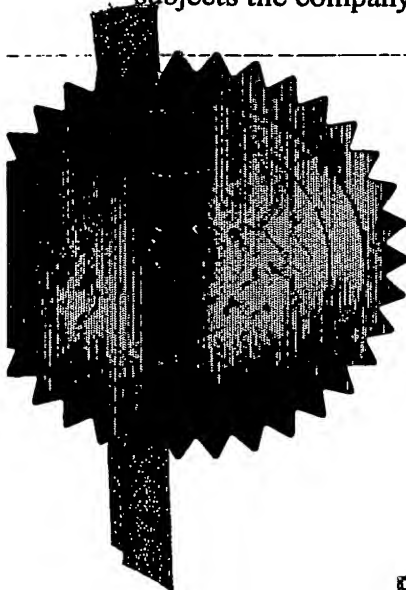
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1/77

## Request for grant of a patent

The Patent Office

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1. Your reference	P34764-/LSA/NHE			1 AUG 2003
2. Patent Application Number (the Patent Office will fill in this part)	0318069.2			0240003 E627157-1 002884 P01/7700 0.00-0318069.2
3. Full name, address and postcode of the or of each applicant ( <i>underline all surnames</i> )	Hugh Fisher Dunree Farm Cottage Dalrymple Ayr KA6 6BA			
Patents ADP number ( <i>if you know it</i> )	8685521001			
If the applicant is a corporate body, give the country/state of its incorporation				
4. Title of the invention	"Building Elements"			
5. Name of your agent ( <i>if you have one</i> )	Murgitroyd & Company			
"Address for service" in the United Kingdom to which all correspondence should be sent ( <i>including the postcode</i> )	Scotland House 165-169 Scotland Street Glasgow G 8PL United Kingdom			
Patents ADP number ( <i>if you know it</i> )	1198015 ✓			
6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and ( <i>if you know it</i> ) the or each application number	Country	Priority application number ( <i>if you know it</i> )	Date of filing (day / month / year)	
7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application		Date of filing (day / month / year)	
8. Is a statement of inventorship and of right to grant a patent required in support of this request? ( <i>Answer 'Yes' if:</i> a) any applicant named in part 3 is not an inventor, or b) there is an inventor who is not named as an applicant, or c) any named applicant is a corporate body. See note (d))	no			

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Description 24

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Statement of inventorship and right to grant of a patent (Patents Form 7/77) -

Request for preliminary examination and search (Patents Form 9/77) -

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11. I/We request the grant of a patent on the basis of this application

Signature

MURGITROYD & COMPANY

Date 31 July 2003

12. Name and daytime telephone number of person to contact in the United Kingdom

Niall Hendry

0141 307 8400

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ICE

Building Elements

1 The present invention relates to elements for the  
2 construction of buildings and other structures.  
3 More specifically, the present invention relates to  
4 elements formed from a single sheet of material.  
5  
6 At present, conventional materials such as bricks  
7 and cast concrete blocks are used in order to form  
8 walls for buildings and other structures. The  
9 normal method of building such walls is to lay a  
10 layer of bricks or blocks and then apply a layer of  
11 wet cement to the bricks before applying another  
12 layer of bricks or blocks on top. This process is  
13 repeated until the wall being built has reached the  
14 desired height. Whilst building using such  
15 materials is not a problem in locations where these  
16 materials are freely available, this can pose  
17 problems in areas where such items, or the raw  
18 materials required to manufacture them, are not so  
19 readily available. For example, the construction of  
20 accommodation in third world countries or disaster

1 areas can be hampered by the lack of desired  
2 materials and building blocks.

3  
4 A further disadvantage of the aforementioned  
5 conventional materials and blocks is that they are  
6 inconvenient and costly to transport if it is not  
7 possible to source or manufacture the required items  
8 locally. This is a problem where speedy  
9 construction of structures is required in remote  
10 areas by, for example, the armed forces when seeking  
11 fortifications in a new area.

12  
13 It is an object of the present invention to mitigate  
14 or obviate one or more of the disadvantages referred  
15 to above.

16  
17 According to a first aspect of the present invention  
18 there is provided a blank for forming a building  
19 element, the blank comprising:

20 an elongate body portion having first and  
21 second ends and a plurality of transverse fold lines  
22 which divide the body portion into a plurality of  
23 panels, the panels each having first and second  
24 longitudinal edges;

25 one or more first tab members extending from  
26 the first end of the body portion; and

27 one or more first apertures adjacent the second  
28 end of the body portion;

29 wherein each of said plurality of panels has at  
30 least one second tab extending from said first  
31 longitudinal edge and a side flange portion adjacent  
32 said second longitudinal edge, and wherein each side

1 flange portion is provided with at least one second  
2 aperture.

3

4 Preferably, each side flange portion is connected to  
5 its respective panel along a longitudinally  
6 extending fold line which extends along the length  
7 of the body portion, the longitudinal fold line  
8 allowing the side flange portions to be folded  
9 substantially perpendicular to their respective  
10 panels.

11

12 Preferably, the body portion has an end flange  
13 portion adjacent the second end thereof, the at  
14 least one first aperture being formed in the end  
15 flange portion. Preferably, the end flange portion  
16 is connected to the body portion along a further  
17 transverse fold line, the further transverse fold  
18 line allowing the end flange portion to be folded  
19 substantially perpendicular to the body portion.

20

21 Preferably, the ends of each side flange portion are  
22 chamfered. Most preferably, each chamfer is at  
23 substantially 45 degrees to the longitudinal fold  
24 line.

---

25

26 Preferably, the body portion has three transverse  
27 fold lines which divide the body portion into four  
28 panels. In one embodiment, the transverse fold  
29 lines are spaced such that the first and third  
30 panels are substantially square. In an alternative  
31 embodiment the transverse fold lines are spaced such  
32 that each panel is substantially square.

1  
2 Preferably, each first and second tab has  
3 substantially right-angled corners. Alternatively,  
4 each first and second tab has rounded corners.

5  
6 Preferably, each panel is stamped to provide a  
7 strengthening formation thereon. Preferably, the  
8 formation is substantially X-shaped. Alternatively,  
9 each panel is provided with a third aperture for  
10 receiving a reinforcing means therethrough.

11  
12 Preferably, the building element is a building  
13 block.

14  
15 Preferably, the blank is formed from galvanised  
16 steel. Alternatively, the blank is formed from a  
17 plastics material.

18  
19 According to a second aspect of the present  
20 invention, there is provided a building block formed  
21 from the blank according to the first aspect of the  
22 present invention.

23  
24 According to a third aspect of the present  
25 invention, there is provided a method of forming a  
26 building block from the blank according to the first  
27 aspect of the invention, the method comprising the  
28 steps of:

29       folding each side flange portion along the  
30 longitudinal fold line until each side flange  
31 portion lies substantially perpendicular to its  
32 respective panel;

1           folding the body portion along each transverse  
2   fold line until adjacent panels lie substantially  
3   perpendicular to one another and the first and  
4   second ends of the body portion are adjacent one  
5   another; and

6           locating the at least one first tab in the  
7   corresponding at least one first aperture and  
8   bending the at least one tab such that the first and  
9   second ends of the body portion are secured  
10   together.

11  
12   According to a fourth aspect of the present  
13   invention, there is provided a blank for forming a  
14   building element, the blank comprising:

15           an elongate body portion having first and  
16   second ends and a plurality of first apertures  
17   formed therein; and

18           first and second side portions integrally  
19   formed with the body portion, each side portion  
20   connected to the body portion along a first  
21   longitudinally extending fold line;

22           wherein each side portion has at least one  
23   second longitudinal fold line which divides the side  
24   portion into at least two sections, and wherein at  
25   least one side portion has a plurality of tabs  
26   extending laterally therefrom.

27

28   Preferably, the blank further comprises first and  
29   second end flanges adjacent the first and second  
30   ends of the body portion, each end flange connected  
31   to the body portion along a transverse fold line;

32



1 In a preferred embodiment, the plurality of first  
2 apertures are formed in two substantially parallel  
3 lines extending longitudinally along the body  
4 portion. Preferably, each of the first and second  
5 side portions has a plurality of tabs extending  
6 laterally therefrom. Preferably, the body portion  
7 further includes a pair of second apertures, one of  
8 the pair located adjacent the first end of the body  
9 portion and the other located adjacent the second  
10 end of the body portion. Preferably, the building  
11 element is a door lintel.

12

13 In an alternative embodiment, the plurality of  
14 apertures are formed in a single line extending  
15 longitudinally along the body portion. Preferably,  
16 the first and second side portions each have a pair  
17 of second longitudinal fold lines which divide each  
18 side portion into three sections. Preferably, the  
19 building element is a window sill.

20

21 Preferably the blank is formed from galvanised  
22 steel. Alternatively, the blank is formed from a  
23 plastics material.

24

25 According to a fifth aspect of the present  
26 invention, there is provided a door lintel formed  
27 from the blank according to the fourth aspect of the  
28 present invention.

29

30 According to a sixth aspect of the present  
31 invention, there is provided a window sill formed

1 from the blank according to the fourth aspect of the  
2 present invention.

3

4 Embodiments of the present invention will now be  
5 described, by way of example only, with reference to  
6 the accompanying drawings, in which:-

7

8 Fig. 1 is a perspective view of a part pre-  
9 formed blank for forming a building block;

10 Fig. 2 is a perspective view of the building  
11 block once formed from the blank of Fig. 1;

12 Fig. 3 is a top view of the formed building  
13 block of Fig. 2;

14 Fig. 4 is a perspective view of the building  
15 block of in Fig. 2 in use;

16 Fig. 5 is a cross sectional view of the  
17 building blocks of Fig. 4 along line V-V;

18 Fig. 6 is a perspective view of a modified  
19 version of the block of Figs.1-5;

20 Fig. 7 is a cross section view of a wall formed  
21 from a number of the modified blocks shown in Fig.6;

22 Fig. 8 is a side view of the part pre-formed  
23 blanks of Fig. 1 as stacked for storage.

---

24 Fig. 9 is a plan view of a blank for forming a  
25 door lintel;

26 Fig. 10 is a perspective part cut-away view of  
27 the formed door lintel;

28 Fig. 11 is a cross sectional view of the formed  
29 door lintel of Fig. 10 along line XI-XI;

30 Fig. 12 is a perspective view of the door  
31 lintel of Figs. 10 and 11 in use;

1           Fig. 13 is a plan view of a blank for forming a  
2 window sill; and

3           Fig. 14 is a perspective view of the window  
4 sill of Fig.13 in use;

5  
6 Referring to drawings, Fig. 1 shows a blank 10 from  
7 which a building element is formed. In this  
8 instance, the building element is a building block  
9 12. In this embodiment, the blank 10 is either cut  
10 or punched from a sheet of galvanised steel,  
11 although it should be understood that any other  
12 suitable sheet metal or plastics material may be  
13 used.

14  
15 The blank 10 is divided into two end panels 14,16  
16 and two side panels 18,20 which are integrally  
17 formed and connected along three fold lines 22 which  
18 extend laterally across the blank 10 at intervals  
19 along the length of the blank 10. The fold lines 22  
20 are formed by perforations made in the blank 10 to  
21 aid folding during assembly, as will be explained  
22 below.

23  
24 Each of the end and side panels 14-20 has an  
25 integral side flange portion 24. Each of the side  
26 flange portions 24 is formed on the same first  
27 longitudinal edge of the blank 10, as shown in  
28 Fig.1. Each side flange portion 24 is connected to  
29 its respective end or side panel 14-20 along a fold  
30 line 23. Each fold line 23 is created by scoring or  
31 using a similar technique on the surface of the  
32 blank 10. Fig.1 shows the blank 10 once the side

1 flange portions 24 have been folded along the fold  
2 lines 23 such that they lie substantially  
3 perpendicular to their respective end or side panel  
4 14-20. Each side flange portion 24 is also provided  
5 with chamfers 26 at either end thereof to allow the  
6 blank 10 to be formed into a cuboid shape, as will  
7 be described below.

8  
9 The side flange portions 24 further include tab  
10 receiving slots 32 formed adjacent the fold lines  
11 23. In the illustrated embodiment, each end panel  
12 14,16 has one tab receiving slot 32, and each side  
13 panel 18,20 has two tab receiving slots 32.  
14 However, it should be appreciated that each panel  
15 14-20 may have any number of tab receiving slots 32,  
16 as desired.

17  
18 The end and side panel 14-20 also include integrally  
19 formed tabs 34 which lie on the second longitudinal  
20 edge of the blank 10, opposite the side flange  
21 portions 24 formed at the first longitudinal edge of  
22 the blank 10. The tabs 34 protrude laterally from  
23 each panel 14,20 so as to be engagable with tab

---

24 receiving slots 32 in an adjacent block (not shown).  
25 In the illustrated embodiment, the end panels 14,16  
26 each have one tab 34, whereas the side panels 18,20  
27 each have two tabs 34. However, it should be  
28 appreciated that each of the panels 14-20 may have  
29 any number of tabs 34 as desired.

30  
31 The first end of the blank 10 on the side panel 20  
32 further includes an end flange portion 38. The end

1 flange portion 38 is formed integrally with the side  
2 panel 20 and are connected along a fold line 40. As  
3 with the fold lines 23 described above, the fold  
4 line 40 is formed on the blank 10 by scoring or a  
5 similar technique. Prior to final assembly, the end  
6 flange portion 38 is folded along fold line 40 so  
7 that it lies substantially perpendicular to the side  
8 panel 20, as shown in Fig.1.

9  
10 The end flange portion 38 further includes tab  
11 receiving slots 42 formed on the end flange portion  
12 38 adjacent the fold line 40. These tab receiving  
13 slots 42 are intended to receive tabs 44 integrally  
14 formed at the second end of the blank 10 on end  
15 panel 14. The tabs 44 protrude longitudinally from  
16 the end panel 14 and are adapted to be engageable  
17 with the tab receiving slots 42. Although the end  
18 panel 14 and end flange portion 38 are illustrated  
19 as having two tabs 44 and two slots 42,  
20 respectively, it should be appreciated that any  
21 suitable number of tabs 44 and corresponding slots  
22 42 may be used.

23  
24 Fig. 2 illustrates a building block 12 formed from  
25 the blank 10 shown in Fig. 1. In the illustrated  
26 embodiment, the building block 12 is formed into a  
27 substantially cuboid shape by folding each of the  
28 panels 14-20 along the fold lines 22. Thus, the end  
29 and side panels 14-20 each form a face of the  
30 building block 12. The building block is secured in  
31 this form by engaging the tabs 44 of the end panel  
32 14 with the tab receiving slots 42 of the end flange

1     portion 38. The end panel 14 lies flush with the  
2     side flange portion 38 and the tabs 44 are first  
3     manipulated so as to protrude through tab receiving  
4     slots 42 and then bent back to fix the end flange  
5     portion 38 and end panel 14 together. Depending on  
6     the thickness of the sheet of material being used,  
7     the tabs can be manipulated either by hand or else  
8     by using a suitable tool.

9

10    As best illustrated in Fig. 3, the chamfered side  
11    flange portions 24 of the blank 10 form a base for  
12    the building block that provides additional  
13    strength. Fig.3 also shows the arrangement of the  
14    slots 32 on the side flange portions 24 once the  
15    blank 10 has been formed into the building block 12.

16

17    As illustrated in Fig. 4, the building block 12 of  
18    Fig. 2 forms one block of a wall 48 of a building or  
19    other structure. The blanks 10 are formed into  
20    building blocks 12 which are then assembled  
21    together. The blocks are laid on top of one another  
22    so that the projecting tabs 34 of the lower block  
23    locate in the slots 32 of the block being laid on

---

24    top. The blocks 12 may be laid straight on top of  
25    one another, but it is preferable to lay each layer  
26    offset the lower layer by one half block length, as  
27    shown in Fig.4. When building the wall 48, ballast  
28    material (not shown) may be poured down into the  
29    hollow blocks 12 in order to provide further  
30    strengthening and rigidity. Fig.4 also illustrates  
31    optional facing plates 49 which may be placed atop  
32    each block 12 in the uppermost layer of the wall 48

1 once the ballast material has been poured. The  
2 plates 49 are provided with slots (not shown) which  
3 engage with the tabs 34 on the uppermost blocks 12.

4  
5 Fig. 5 illustrates how the building blocks 12 are  
6 fixed together in the wall 48 shown in Fig.4. As  
7 seen in Figs. 4 and 5, one building block 12 is laid  
8 upon another so that the tabs 34 of the lower block  
9 12 engage with the slots 32 in the base of the upper  
10 block. As discussed above, the blocks 12 may either  
11 be stacked upon one another, or else laid in an  
12 offset fashion such that upper block 12 is offset  
13 from the lower block 12 by one half length. Once  
14 the blocks 12 are in the desired position and the  
15 tabs 34 are in the corresponding slots 32, the  
16 building blocks 12 are secured together by bending  
17 the tabs 34 inwardly until they lie flush with the  
18 side flange portions 24 of the upper block, as seen  
19 in Fig.5. The tabs 34 may be bent by hand or by  
20 using a tool.

21  
22 Figs. 6 and 7 show views of a modified version of  
23 the block described above. The majority of the  
24 features of the modified block 200 are shared with  
25 the block 12 described above, and will therefore not  
26 be described further here. The modification to the  
27 block 200 is to introduce additional fixing slots  
28 202,204 on each panel.14-20 to ensure that the  
29 blocks 200 remain securely fixed together when  
30 formed into a wall. As seen in Fig.6, each panel  
31 14-20 has an upper fixing slot 202 and a lower  
32 fixing slot 204. In the illustrated embodiment, the

1 side panels 18,20 have pairs of upper and lower  
2 fixing slots 202,204, although they may also have  
3 only one upper fixing slot 202 and one lower slot  
4 204 if desired. The upper and lower fixing slots  
5 202,204 are each located adjacent the top and bottom  
6 of each panel 14-20, respectively.

7  
8 Fig.7 shows a number of blocks 200 arranged in a  
9 wall. The blocks 200 are arranged upon each other  
10 as previously described, with the tabs 34 of the  
11 lower block 200 locating in the tab receiving slots  
12 32 of the upper block 200. However, with the  
13 modified blocks 200, plastic cable ties 210 are also  
14 introduced to hold the blocks 200 together. With  
15 the blocks arranged upon one another, the male  
16 components of the cable ties 210 are threaded out of  
17 the upper block 200 via the lower fixing slots 204  
18 and into the lower block 200 via the corresponding  
19 upper fixing slots 202 in the lower block. The male  
20 components of the ties 210 are then finally threaded  
21 up through the tab receiving apertures 32 in the  
22 upper block 200 where they are fastened through the  
23 female components of the ties in the bottom of the  
24 upper block 200. Once the ties 210 are fastened,  
25 the blocks 200 are held together in the wall.

26  
27 In order to make the blocks 12 easily transportable,  
28 the blanks 10 illustrated in Fig.1 are able to be  
29 flat packed for easy storage and transportation.  
30 Fig. 8 is an end view of the blanks 10 when stored  
31 for transportation. The first two blanks 10 are  
32 laid so that their longitudinal sides provided with



1 the tabs 34 (the second longitudinal sides, as  
2 described above) abut one another. With the blanks  
3 10 laid in this manner, the pre-bent side flange  
4 portions 24 of each blank 10 face one another, with  
5 the blanks 10 each having a substantially L-shaped  
6 profile when viewed end-on, as in Fig.8. Further  
7 blanks are then placed one after another on top of  
8 these first blanks, such that the second  
9 longitudinal sides of the blanks 10 overlap in the  
10 centre of the stack and are interleaved as more  
11 blanks are added. Eventually, the stacked blanks 10  
12 will resemble a truncated pyramid shape, as shown in  
13 Fig.8, as each new blank is laid upon the previous  
14 blank so that the side flange portions 24 of each  
15 blank lie flush inside one another. The stack is  
16 completed when it is no longer possible to fit a new  
17 blank in between the opposing side flange portions  
18 of the interleaved blanks. A typical complete stack  
19 of blanks 10 such as that shown in Fig.8 would  
20 comprise 225 blanks. Furthermore, a typical  
21 military air-lift pallet would be able to hold  
22 eleven stacks, which would be enough to make some  
23 2,475 blocks.

24  
25 Referring now to Figs. 9-12, it may often be  
26 necessary to include a doorway in a wall created  
27 from the building blocks 12 described above. Figs.  
28 9-12 illustrate building element in the form of a  
29 door lintel 50 that can be used in combination with  
30 a wall of the previously described building blocks  
31 in order to form such a doorway.

32

1 Fig. 9 shows a blank 54 from which the door lintel  
2 50 is formed. As with the building blocks 12, in  
3 the illustrated embodiment the blank 54 is either  
4 cut or punched from a sheet of galvanised steel,  
5 although any other sheet metal or suitable plastics  
6 material may be used. The blank 54 comprises an  
7 elongate body, or central, portion 58 and two side  
8 portions 64,66 which are integrally formed with the  
9 body portion 58. The body portion 58 and side  
10 portions 64,66 are connected along a pair of  
11 longitudinally extending fold lines 68. The body  
12 portion 58 is also provided with a pair of end  
13 flange portions 72 which are integrally formed with  
14 the body portion 58 at respective ends thereof.  
15 Each end flange portion 72 is connected to the body  
16 portion 58 along a lateral fold line 70. The fold  
17 lines 68,70 may either be perforated or scored in  
18 order to aid folding during assembly. The body  
19 portion 58 is also provided with a plurality of  
20 slots 76,77 which, in the illustrated embodiment,  
21 are provided in two substantially parallel lines.

22  
23 Each side portion 64,66 is divided longitudinally in  
24 two by a side portion fold line 78. The  
25 longitudinal fold lines 78 are provided by either  
26 perforating or scoring the blank 54 in order to aid  
27 folding during assembly. Each side portion 64,66  
28 also includes a plurality of tabs 80 formed  
29 integrally therewith. The tabs 80 protrude  
30 laterally from the free longitudinal edge of each  
31 side portion 64,66 and are adapted to be engageable

1 with the tab receiving slots 76,77 in the body  
2 portion 58, as will be explained below.

3

4 Although in the illustrated embodiment, the body  
5 portion 58 is shown to have eight slots in each line  
6 of slots 76,77 and the side portions 64,66 are each  
7 shown to have eight corresponding tabs 80, it will  
8 be appreciated that any appropriate number of slots  
9 76,77 and corresponding tags 80 may be used.

10

11 Figs. 10 and 11 of the drawings illustrate a partial  
12 cut-away and cross sectional view, respectively, of  
13 the door lintel 50 formed from the blank 54 of Fig.  
14 9. As illustrated, the door lintel 50 is formed by  
15 firstly folding end flange portions 72 downward  
16 along lateral fold lines 70 into a position whereby  
17 the end flange portions 72 are substantially  
18 perpendicular to the body portion 58. Next, the  
19 side portions 64,66 are folded firstly along  
20 longitudinal fold lines 68 and then along the  
21 longitudinal fold lines 78 into a position whereby  
22 the tabs 80 of side portions 64,66 are adjacent to  
23 tab receiving slots 76,77 of the body portion 58.  
24 The tabs 80 can then be located in the slots 76,77  
25 and folded out towards the sides of the body portion  
26 58 by hand or with a tool. Folding the side  
27 portions 64,66 in the manner described leaves them  
28 having a substantially V-shaped profile, as can be  
29 seen best in Fig.11. These V-profiles provide  
30 additional strength to the door lintel 50 when in  
31 situ.

32

1 Fig. 12 illustrates how the door lintel 50 is  
2 attached to a wall of building blocks 12 in order to  
3 form a doorway in the wall. The door lintel 50 is  
4 provided with a locating slot 56 at each end thereof  
5 and is attached to the wall by locating the lintel  
6 50 onto a building block 12 on either side of the  
7 doorway. The door lintel 50 is positioned on each  
8 of the pair of building blocks 12 such that the end  
9 flange portions 72 of the lintel 50 enter the blocks  
10 12 and lie flush with the end walls 16 of the  
11 building blocks 12. At the same time, the tabs 34  
12 protruding from the end walls 16 of the blocks 12  
13 are engaged with the locating slots 56 of the lintel  
14 50. Once the lintel 50 is successfully located, it  
15 is secured in place by bending the tabs 34 of the  
16 building blocks 12 so that they are substantially  
17 flush with the body portion 58 of the lintel 50.

18  
19 Referring now to Figs. 13 and 14, it will also  
20 sometimes be desirable to include one or more  
21 windows in a wall of the building blocks. Fig. 13  
22 shows a blank 84 from which a window sill 86 is  
23 formed. The blank 84 is either cut or punched from  
24 a sheet of galvanised steel, although any other  
25 suitable sheet metal or plastics material may be  
26 used.

27  
28 The blank 84 comprises a body portion 88 integrally  
29 formed with first and second side portions 94,96.  
30 The body portion 88 and side portions 94,96 are  
31 connected along a first pair of longitudinal fold  
32 lines 98. As with the previous embodiments

1 described, the fold lines may be perforated or  
2 scored onto the blank 84 to aid folding. The body  
3 portion 88 is also provided with integral end flange  
4 portions 102 at either end thereof. The end flange  
5 portions are connected to the body portion 88 along  
6 respective lateral fold lines 100. The body portion  
7 88 also includes a plurality of tab receiving slots  
8 106 aligned longitudinally thereon.

9  
10 The second side portion 96 is divided into three  
11 sections 96A-96C by a further two longitudinal fold  
12 lines 108,109 which run along the second side  
13 portion 96 substantially parallel to longitudinal  
14 fold lines 98. Again, the fold lines 108,109 are  
15 perforated or scored on the blank 84 to aid folding  
16 during assembly. The first side portion 94 is also  
17 divided into three sections 94A-94C by an additional  
18 two longitudinal fold lines 110,111 which also run  
19 substantially parallel to the longitudinal fold lines  
20 98.

21  
22 The first side portion 94 further includes tabs 112  
23 formed integrally with the outermost section 94C of  
24 the side portion 94. The tabs 112 protrude  
25 laterally from the outer edge of the outermost  
26 section 94C and are adapted to be engageable with  
27 the tab receiving slots 106 in the body portion 88.

28  
29 As with the previously described embodiments, the  
30 number of tabs 112 and corresponding slots 106 may  
31 be greater or less than eight, depending on the  
32 requirements of the particular application.

1  
2 Fig. 14 illustrates a window sill 86 formed from the  
3 blank 84 shown in Fig. 13. The window sill 86 is  
4 formed by firstly folding end flange portions 102  
5 downward along lateral fold lines 100 until they lie  
6 substantially perpendicular to the body portion 88.  
7 Next, the first side portion 94 is folded downwards  
8 relative to the body portion 88 along longitudinal  
9 fold line 98 until the first side portion 94 is  
10 substantially perpendicular to the body portion 88.  
11 The intermediate and outermost sections 94B, 94C of  
12 the first side portion 94 are then folded inwardly  
13 along fold line 110 by substantially 90 degrees  
14 relative to the inner section 94A, and the outermost  
15 section 94C is then folded inwardly by 90 degrees  
16 relative to the intermediate section 94B along fold  
17 line 111. This folding forms the first side portion  
18 94 into a substantially cuboidal shape, as seen best  
19 in Fig. 12, from where the tabs 112 of the first  
20 side portion 94 can be engaged with the tab  
21 receiving slots 106 of the body portion 88. Once  
22 engaged with the slots 106, the tabs 112 are bent by  
23 hand or using a tool so that they lie flush with the  
24 upper surface of the body portion 88.  
25  
26 Once the first side portion 94 has been folded into  
27 its desired shape to form the load-bearing "body" of  
28 the window sill 86, the second side portion 96 can  
29 be folded to form the protective "canopy" of the  
30 window sill 86. To create the canopy, the second  
31 side portion 96 is folded downwards relative to the  
32 body portion 88 along longitudinal fold line 98

1 until it lies at substantially 90 degrees to the  
2 body portion 88. Next, the intermediate and  
3 outermost sections 96B, 96C of the second side  
4 portion 96 are bent upwardly relative to the inner  
5 section 96A along fold line 108 until the  
6 intermediate section 96B lies at angle of  
7 approximately 45 degrees relative to the inner  
8 section 96A, as seen best in Fig.14. Finally, the  
9 outermost section 96C is folded downwards relative  
10 to the intermediate section 96B along fold line 109  
11 until the outermost section 96C lies in a plane  
12 substantially parallel to that of the inner section  
13 96A. As an option, the outermost section 96C may  
14 also be provided with a further longitudinal fold  
15 line (not shown) which allows a lip to be formed on  
16 the outermost section 96C such that a rounded edge  
17 is provided. The window sill is then ready to be  
18 attached to a wall of building blocks, such as that  
19 shown in Fig.14.

20  
21 Thus, the present invention provides a number of  
22 building blocks which are formed from single sheets  
23 of metal or plastic. The blanks for these blocks  
24 can be punched or cut from the sheet of material and  
25 then flat packed for easy transportation and  
26 storage. The blanks can be transported to locations  
27 where raw building materials are in short supply and  
28 then assembled in a very straightforward manner  
29 using only the builder's hands. There is therefore  
30 no need to source scarce materials or specialist  
31 tools to assemble buildings and structures from the

1 building elements according to the present  
2 invention.

3

4 It should be appreciated that the illustrated  
5 building block may also be dimensioned so as to form  
6 a cube shape, in order that half-size blocks can be  
7 used to form a particular shape of wall or  
8 structure. As already highlighted above, the  
9 building block, door lintel and window sill  
10 described herein have been formed from galvanised  
11 sheet steel, but any other type of sheet metal or  
12 suitable plastics material could be used, so long as  
13 a suitable weatherproof coating or treatment has  
14 been applied. Furthermore, the tabs of the block,  
15 lintel and window sill have each been illustrated as  
16 being substantially rectangular. However, it should  
17 be appreciated that in order to aid engagement with  
18 the tab receiving slots, the tabs may have rounded  
19 edges.

20

21 A further modification to the tabs would be to make  
22 them longer so that they can not only fold flush  
23 onto a panel or flange, but extend so that they can  
24 be folded back upon themselves for extra strength to  
25 the join. Alternatively, the tabs could be reduced  
26 in length to such an extent that they are merely  
27 used as positioning means which engage the tab  
28 receiving slots but do not protrude through the  
29 slots. In this alternative embodiment, the securing  
30 of the building blocks in a wall would be carried  
31 out by adding further tab receiving slots adjacent  
32 the tabs and the tab receiving slots, and then using



1 wire or plastic ties through the slots to secure the  
2 building blocks together.

3  
4 Although the building blocks have been illustrated  
5 as being formed from substantially planar side and  
6 end panels, the panels may also be stamped with a  
7 formation that adds strength to the panels (e.g. an  
8 X-shaped stamp covering the majority of the panel)  
9 The panels of the building blocks may also each be  
10 provided with one or more punch-out discs. The one  
11 or more discs are aligned with a corresponding one  
12 or more discs in the opposite panel of the block.  
13 If reinforcement of the blocks is desired, the discs  
14 can be punched out to allow the blocks to receive  
15 reinforcement rods which pass through the blocks to  
16 provide additional strengthening.

17  
18 The buildings and structures made from the blocks  
19 may insulated and stablised by filling each block 12  
20 with a suitable filling material, such as concrete,  
21 sand, earth, clay, gravel, rubble or any other  
22 similar available material, depending on the  
23 availability of such materials in then area of  
24 construction. The blocks may also be made thermally  
25 insulated or made fire-resistant by inserting  
26 appropriate insulating foam or fire-retardant foam  
27 into the blocks during construction.

28  
29 A further application of the blocks would be as part  
30 of a flood prevention system. A wall of the blocks  
31 forms a first protection layer against the flood,  
32 with a lower layer of blocks 12 being anchored in

1 the ground by an appropriate means such as, for  
2 example, scaffolding tubes. The tubes pass down  
3 through the layered blocks into the ground. The  
4 scaffolding tubes can be set in the blocks using  
5 cement or the like to fix the tubes in place. In  
6 addition to the first wall of blocks, a second wall  
7 may be constructed to the rear of the first and  
8 waterproofing may be applied to one or both of the  
9 walls. The waterproofing may be a sheet membrane,  
10 or any other type of waterproofing.

11  
12 The building blocks can be utilised to form  
13 foundations of buildings and other structures. For  
14 example, four building blocks could be arranged to  
15 form a substantially square base unit, and further  
16 blocks could be stacked in a conventional vertical  
17 manner on top of the base unit to a suitable height.  
18 The building blocks would be filled with cement, or  
19 another suitable material and reinforced with  
20 typical reinforcing members such as the  
21 aforementioned scaffolding tubes or steel  
22 reinforcement rods, for example. The flexibility of  
23 the arrangement of the blocks means that virtually  
24 any configuration of foundation can be achieved.

---

25  
26 A wall constructed from the building blocks of the  
27 present invention also provides an ideal surface for  
28 applying either an internal or external cladding  
29 layer. The blocks can be sprayed with a suitable  
30 treatment (e.g. for fire-proofing) and then the  
31 cladding can be applied to the wall quickly and  
32 cheaply by simply using self-tapping screws, or the

1     like, that penetrate the sheet material of the block  
2     and fix the cladding thereto.

3

4     The blocks may also be utilised to form permanent  
5     shuttering (not shown) for the foundations of  
6     buildings or the like.

7

8     A yet further application of the building blocks is  
9     that if the blocks are made from a sufficient  
10    thickness and/or type of metal or plastics, they can  
11    be used to form a building or structure that is  
12    resistant to attack. Thus, the blocks can be used  
13    to quickly and simply construct military and  
14    security installations (e.g. checkpoints).

15    Buildings formed from the blocks would also be less  
16    susceptible to ram-raid attacks, where an attempt is  
17    made to drive a vehicle through the wall of a  
18    building or installation.

19

20    These and other modifications and improvements may  
21    be made to the above without departing from the  
22    scope of the present invention.

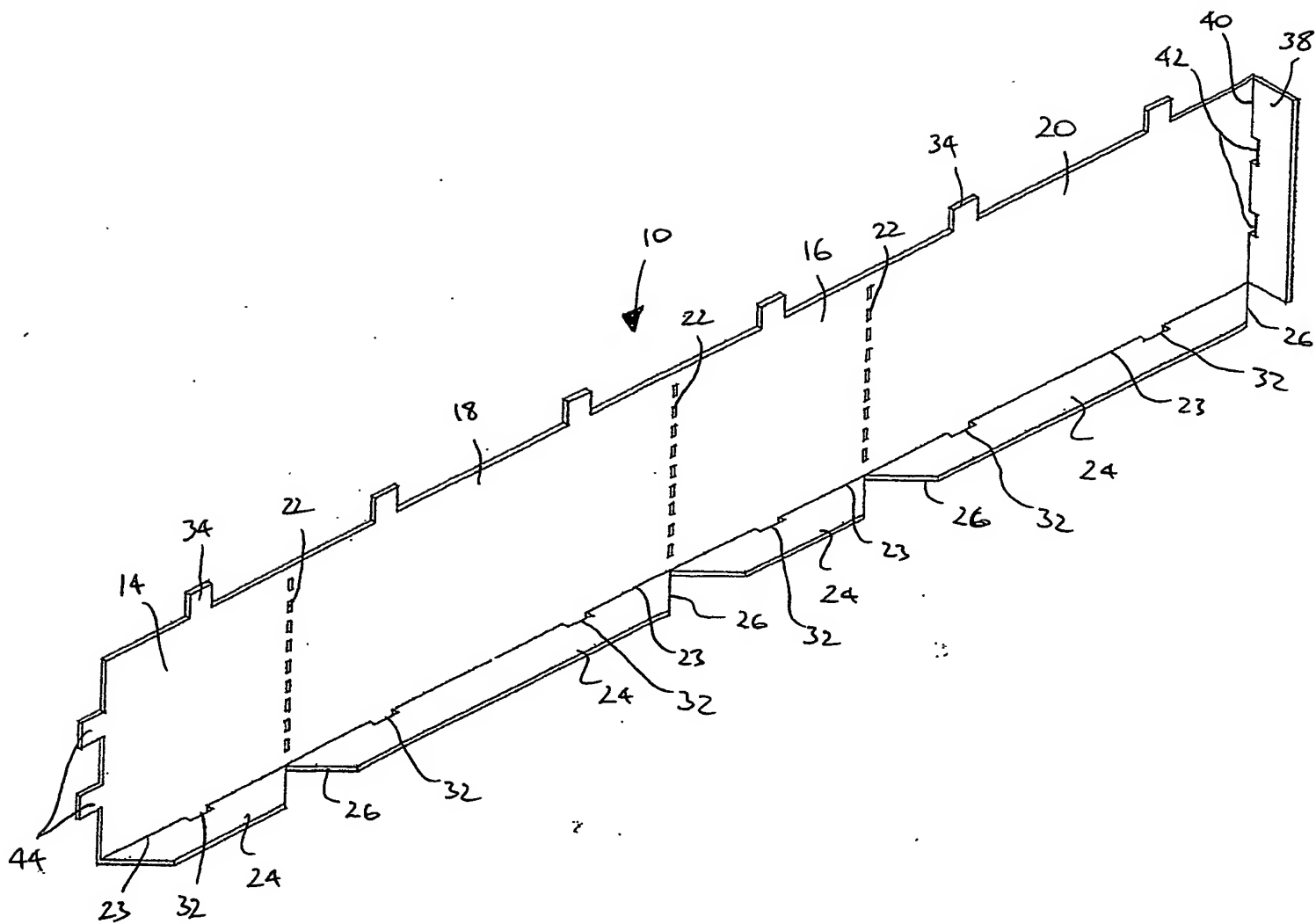


Fig. 1

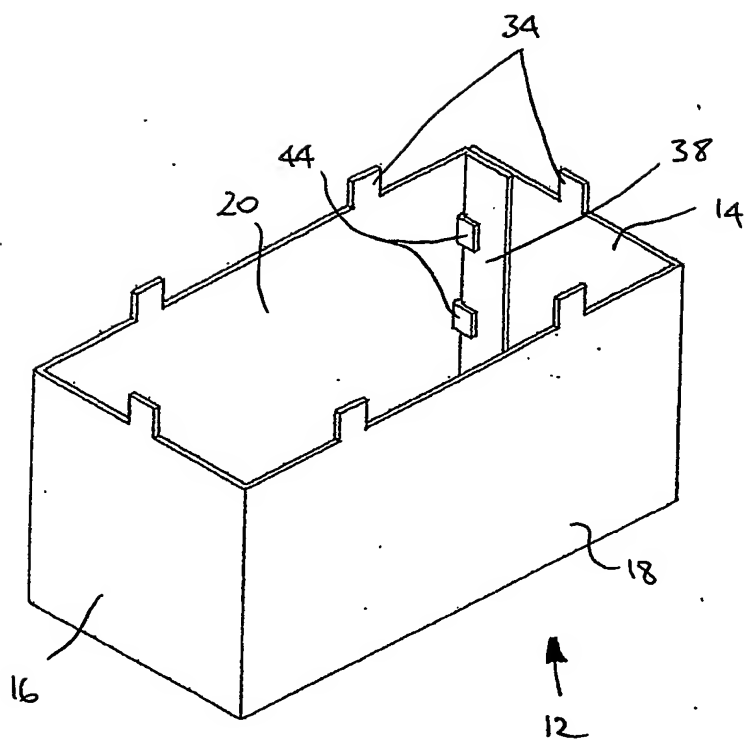


Fig. 2



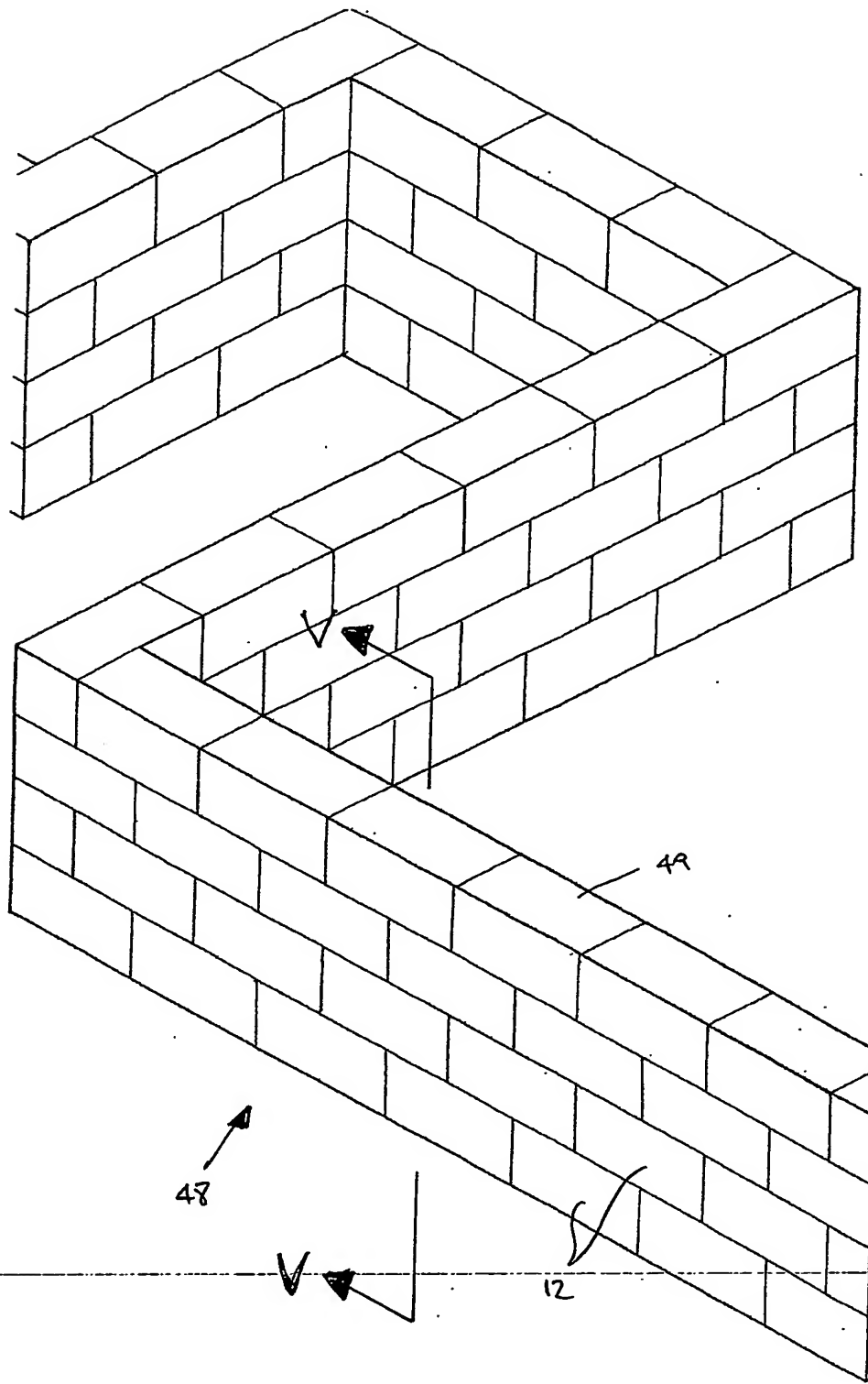


Fig. 4.

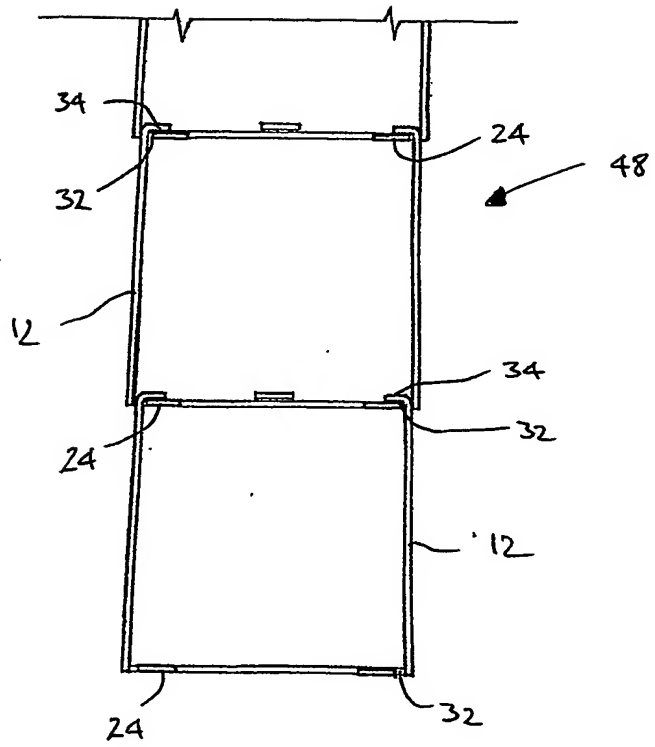


Fig. 5



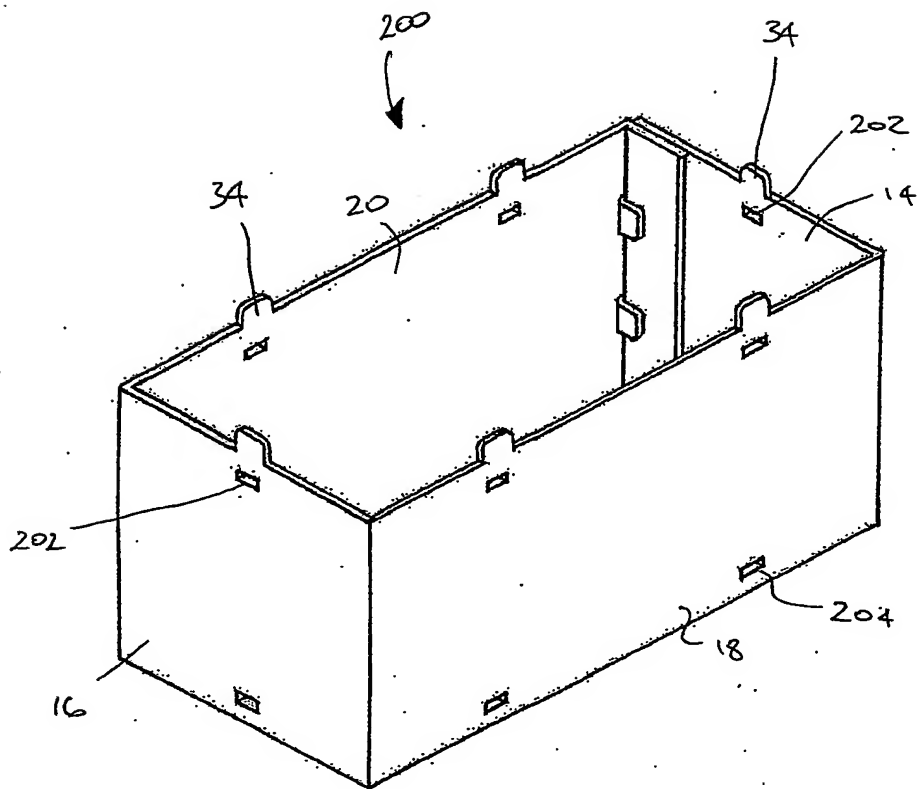


Fig. 6

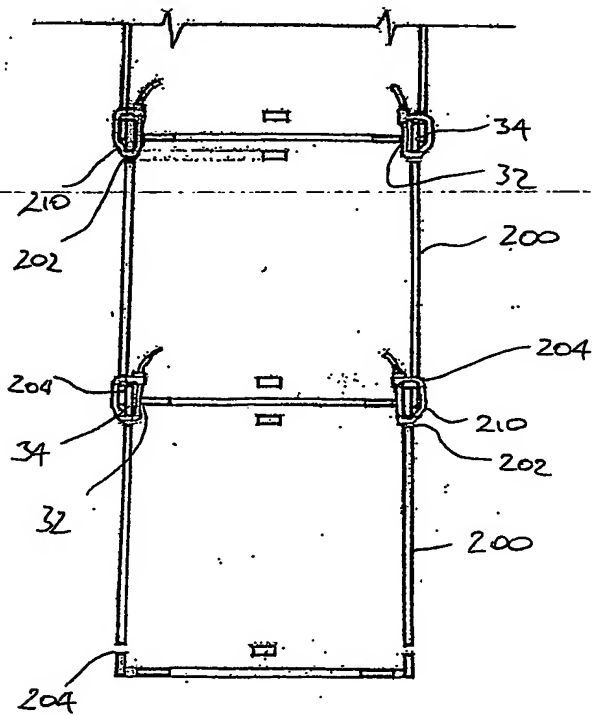


Fig. 7

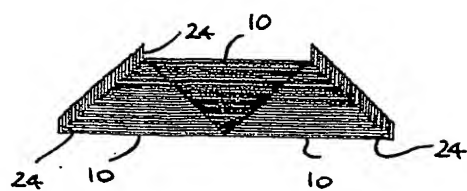


Fig. 8

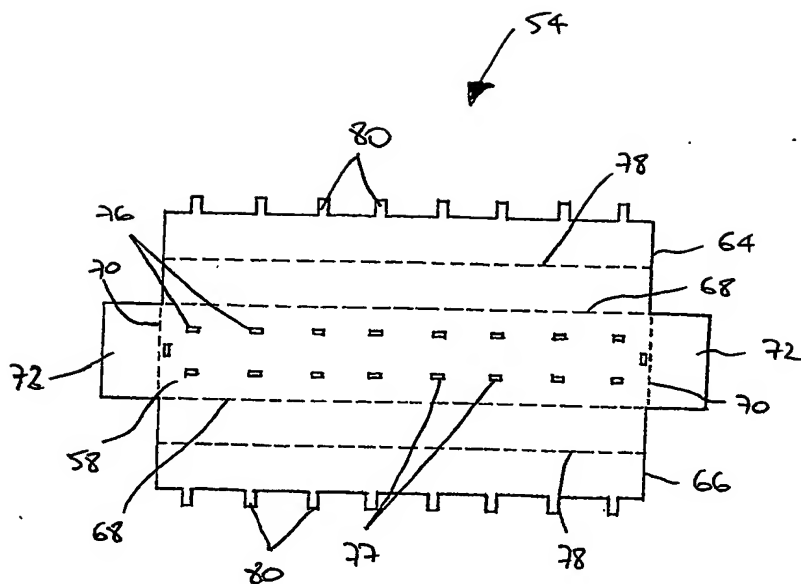


Fig. 9

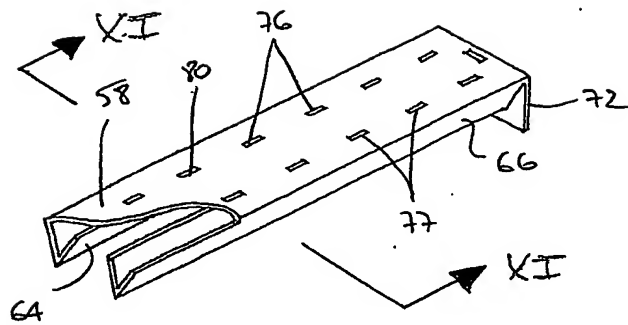


Fig. 10

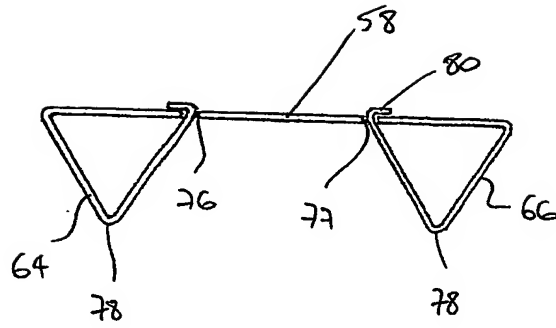


Fig. 11

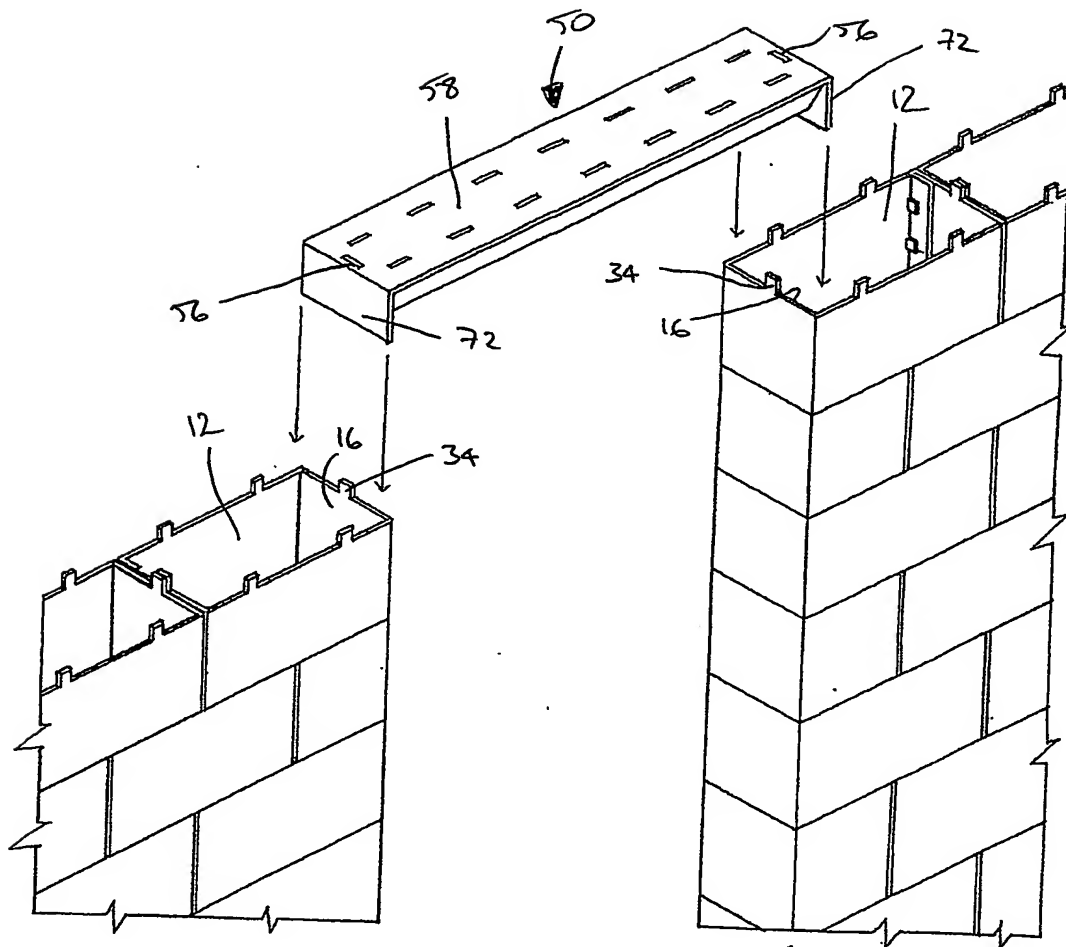


Fig. 12

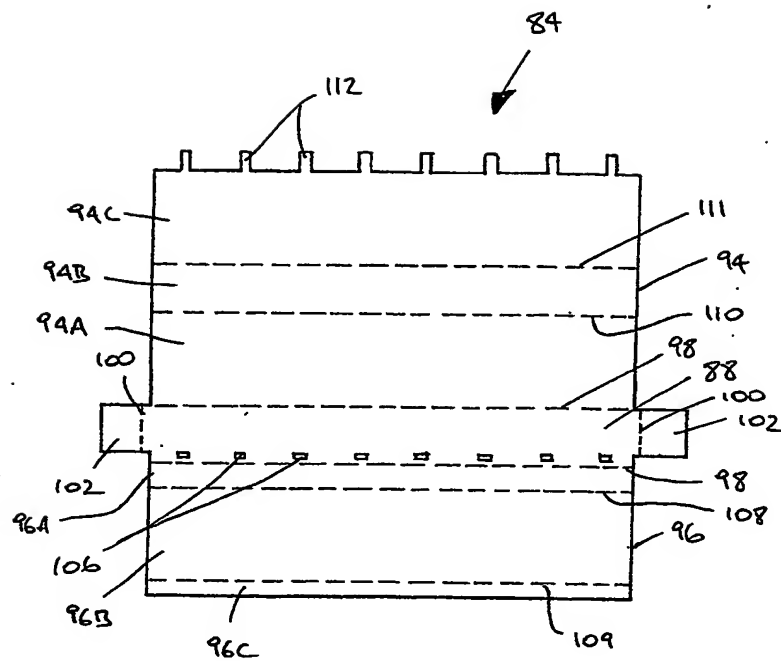


Fig. 13

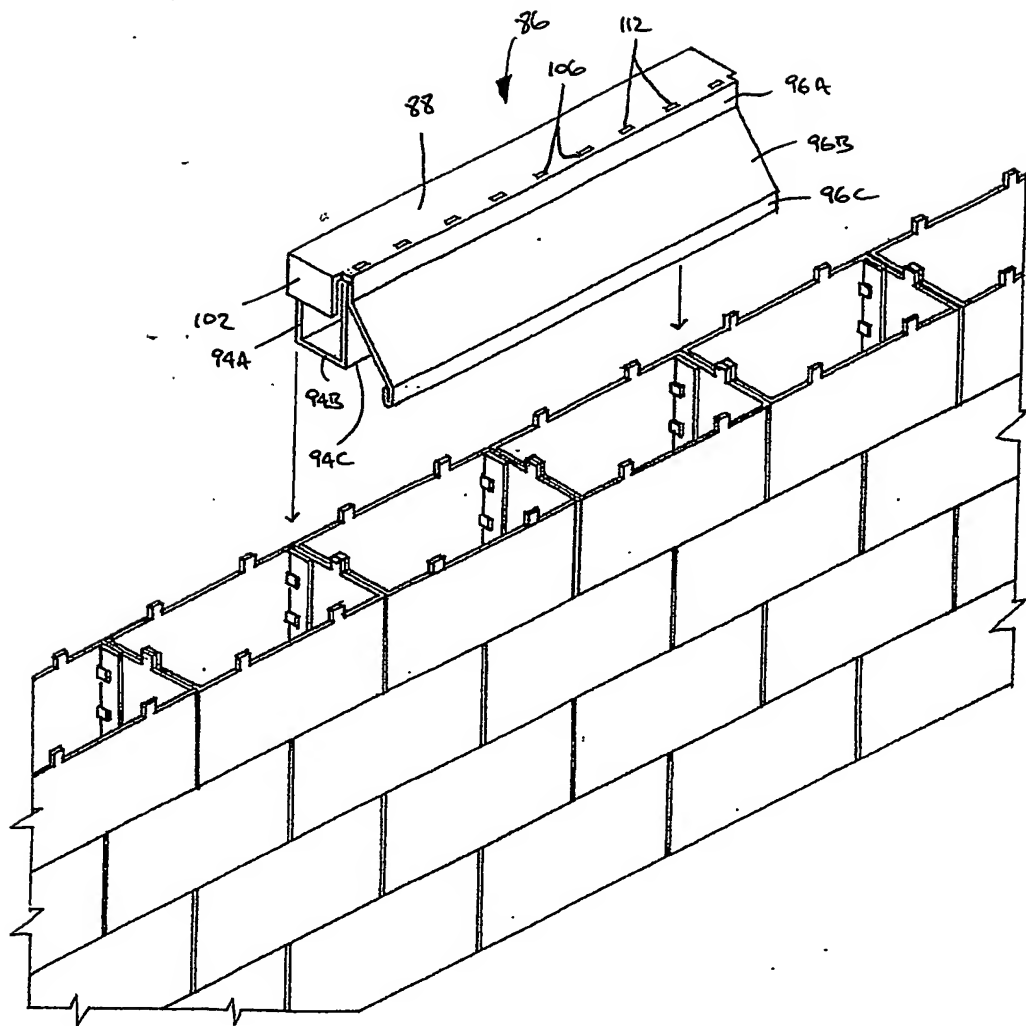


Fig. 14



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